IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE BOARD OF PATENT APPEALS AND INTERFERENCES

In re PATENT application of:

Applicant:	Hans Meesen
Application No.:	10/780,113
Filing Date:	17 February 2004
Title:	DUNNAGE CONVERSION SYSTEM WITH MULTI-PLY WEB DETECTION
Examiner:	Hemant Desai
Art Unit:	3721
Atty. Docket No.	RANPP0352USA

Appeal Brief

Mail Stop Appeal Brief-Patents
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Dear Sir:

This brief is submitted in support of an appeal of the decision of the Examiner mailed 16 June 2006, finally rejecting claims 1-14 of the above-identified application.

This brief is being filed electronically and the fee for filing an appeal brief is being paid by credit card. In the event an additional fee is necessary, the Commissioner is authorized to charge any additional fee which may be required to Deposit Account No. 18-0988 under Docket No. RANPP0352USA.

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I. Real Party in Interest

The real party in interest in the present appeal is the assignee, Ranpak Corp.

II. Related Appeals and Interferences

Appellant, appellant's legal representatives, and/or the assignee of the present application are unaware of any appeals or interferences which will directly affect, which will be directly affected by, or which will have a bearing on the Board's decision in the pending appeal.

III. Status of Claims

Claims 1-14 stand finally rejected and are the subject of this appeal.

IV. Status of Amendments

A response that did not include any amendments to the claims was filed after the final rejection. In an Advisory Action, the Examiner indicated that the response would not be entered,[1] but since no amendments were requested that seems to be incorrect.

[1] Advisory Action, Paper No. 20060804.

V. Summary of Claimed Subject Matter

The following paragraphs provide a concise explanation of the subject matter defined in each of the independent claims involved in the appeal, with references to the specification by page and line number, and to the drawings by reference characters.

Claim 1

A dunnage conversion system 10[2] for converting multiple plies of sheet material[3] into a relatively less dense, three-dimensional dunnage product[4] comprises (1) a converter 40 including a conversion assembly 24 that is driven by a motor 34 to advance multiple plies of sheet material through the converter for conversion of the multiple plies of sheet material into a relatively less dense, three-dimensional dunnage product,[5] (2) a controller 30 that controls operation of the motor 34,[6] and (3) an end-of-web detector 14 located upstream of the conversion assembly 24.[7] Further, the multiple plies of sheet stock material are fed to the conversion assembly 24 along

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[2] Specification, p. 3, lines 5-9; and p. 4, line 31 to p. 5, line1; and FIGS. 1 and 2.

[3] Specification, p. 3, lines 5-9; and p. 5, lines 5-11; and FIGS. 1 and 2.

[4] Specification, p. 3, lines 5-9; and p. 5, lines 12-29.

[5] Specification, p. 5, lines 16-29.

[6] Specification, p. 5, lines 19-25.

[7] Specification, p. 5, lines 12-15; and p. 8 lines 22-25; and FIGS. 2-4.

respective infeed paths 80 and 82.[8] And the end-of-web detector 14 includes plural sensors 86 and 88 respectively associated with the separate infeed paths 80 and 82 for detecting the presence or absence of the respective ply and providing an output to the controller 30 indicative thereof.[9]

Claim 8

A method of converting multiple plies of sheet material into a relatively less dense, three-dimensional dunnage product, comprises the following steps:

(1) operating a motor 34 of a converter 40 to drive a conversion assembly 24 that advances multiple plies of sheet material through the converter 40 for conversion of the multiple plies of sheet material into a relatively less dense dunnage product;[10]

(2) feeding multiple plies of sheet stock material to the conversion assembly 24 along respective infeed paths 80 and 82;[11]

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[8] Specification, p. 5, lines 12-29; p. 7, lines 1-4; and p. 7, lines 19-22; and FIG 4.

[9] Specification, p. 7, lines 23-26.

[10] Specification, p. 5, lines 20-29; p. 8, lines 29-32.

[11] Specification, p. 5, lines 12-29; p. 7, lines 1-4; and p. 7, lines 19-22; and FIG 4.

(3) using plural sensors 86 and 88 respectively associated with the separate infeed paths 80 and 82 to detect the presence or absence of the respective ply;[12] and

(4) ceasing operation of the motor 34 in response to a signal from any one of the plural sensors 86 and 88.[13]

Claim 14

A dunnage conversion system 10[14] for converting multiple plies of sheet material[15] into a relatively less dense, three-dimensional dunnage product[16] comprises (1) means for converting multiple plies of sheet stock material into a relatively less dense, three-dimensional dunnage product,[17] where the multiple plies of sheet stock material are fed to the means for converting along respective infeed paths 80 and 82,[18] (2) means for detecting the presence of each ply associated with the respective infeed paths 80 and 82 and for providing an output indicating the presence or absence of each

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[12] Specification, p. 7, lines 23-26.

[13] Specification, p. 9, lines 3-7.

[14] Specification, p. 3, lines 5-9; and p. 4, line 31 to p. 5, line1; and FIGS. 1 and 2.

[15] Specification, p. 3, lines 5-9; and p. 5, lines 5-11; and FIGS. 1 and 2.

[16] Specification, p. 3, lines 5-9; and p. 5, lines 12-29.

[17] Specification, p. 5, lines 16-29.

[18] Specification, p. 5, lines 12-29; p. 7, lines 1-4; and p. 7, lines 19-22; and FIG 4.

ply,[19] and (3) means for controlling the means for converting in response to the output from the means for detecting.[20]

The claim thus includes three separate means plus function limitations per 35 U.S.C. §112, sixth paragraph, and the structure, material or acts described in the specification that correspond to the claimed function are set forth in the following numbered paragraphs corresponding to the numbered elements in the claim reproduced above.

(1) The converting means corresponds to a dunnage converter, such as a converter including a conversion assembly that is driven by a motor to advance multiple plies of sheet material through the converter for conversion into a relatively less dense, three-dimensional dunnage product.[21] Various dunnage converters (also commonly called cushioning conversion machines) heretofore have been used to convert sheet stock material into a dunnage product for use in packaging items in containers for shipment.[22]

An exemplary dunnage converter includes a forming assembly 22 and feeding assembly 24 that cause crumpling of the stock material alone or in conjunction with an inward turning or folding of lateral edge portions of the sheet stock material, and this

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[19] Specification, p. 7, lines 23-26.

[20] Specification, p. 9, lines 3-7.

[21] Specification, p.

[22] Specification, p. 1, lines 13-15.

may form one or more pillow portions. The forming assembly 22 can include a former located within a converging chute, and the feeding assembly 24 can include opposed translating or rotating members, e.g., gear-like members, that define therebetween a pinch zone through which a portion of the stock material is squeezed. One or both of the translating or rotating members is driven whereby such members function to move the stock material through the system.[23]

In addition, the converter may include a constant entry roller 18, a separating assembly 20, a severing assembly 26, and an exit chute 28 that may contribute to converting the stock material into a dunnage product. Not all of the above-mentioned components need be employed, however. For instance, some dunnage converters do not employ a separating assembly. Also, one or more of the components may perform multiple functions. For example, the feeding assembly may also perform a crumpling and/or connecting function that maintains or assists in maintaining the converted shape and character of the three-dimensional dunnage product.[24] Additional feeding devices could also be provided.[25]

(2) The detecting means includes an end-of-web detector 14 having plural sensors 86 and 88 respectively associated with the separate infeed paths 80 and 82 for

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[23] Specification, p. 6 lines 11-20.

[24] Specification, p. 6, lines 4-10.

[25] Specification, p. 6, line 20.

detecting the presence or absence of the respective ply of sheet stock material and providing an output to the controller 30 indicative thereof. Each sensor 86 and 88 includes a transmitter 90 for transmitting an electromagnetic beam and a receiver 92 for receiving the electromagnetic beam. The transmitter and receiver of each sensor 86, 88 are located on the same side of the infeed path 80, 82 for the respective ply of sheet stock material. On the other side of the infeed path 80, 82 there is located a reflective surface 98, 100. The reflective surface is positioned to reflect the electromagnetic beam transmitted by the transmitter to the receiver of the respective sensor.[26]

Alternatively, the reflective surfaces for the illustrated pair of the sensors may be located on opposite sides of a reflector body 102 located between the infeed paths 80 and 82 of respective plies of the sheet stock material. The detector 14 can include one or more additional sensors for detecting one or more additional plies. Those skilled in the art will appreciate that the sensors 86, 88 and reflectors 98, 100 can be otherwise arranged, and that other type of sensors can be employed. For instance, the receivers may be positioned opposite the transmitters in place of the reflectors, or vice versa. Also, the reflectors may be replaced by other devices such as a prism, which can function to redirect incident light to the location of the receiver. Also, transmitters of other types may be used, such as an ultrasonic transmitter.[27]

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[26] Specification, p. 7, line 23 through p. 8, line 21.

[27] Specification, p. 7, line 23 through p. 8, line 21.

(3) The controlling means includes a controller 30, which can be of a well-known type and preferably uses a microprocessor or other suitable logic device. In addition, the functions of the controller can be carried out by one or more processors located in a single unit or separate units.[28]

[28] Specification, p. 6 lines 21-24.

VI. Grounds of Rejection to be Reviewed on Appeal

A. Whether claims 1-4, 7, 8, and 12-14 are unpatentable under 35 U.S.C. §103(a) over U.S. Patent No. 5,749,821 to Simmons in view of U.S. Patent No. 5,356,363 to Kopp et al.

B. Whether claims 5, 6, and 9-11 are unpatentable under 35 U.S.C. §103(a) over Simmons in view of Kopp and further in view of U.S. Patent No. 6,756,096 to Harding.

VII. Argument

The rejection of claims 1-14 under U.S.C. §103(a) as being unpatentable over Simmons in view of Kopp, or Simmons and Kopp in view of Harding, was improper for failure to state a *prima facie* case of obviousness for want of any teaching, suggestion or motivation to combine Simmons, Kopp or Harding in a manner that would yield the claimed subject matter.

<u>Claim 1</u>

Claim 1 recites a dunnage conversion system for converting multiple plies of sheet material into a relatively less dense, three-dimensional dunnage product. The system includes, *inter alia*, an end-of-web detector with plural sensors associated with separate infeed paths for detecting the presence or absence of a respective ply and providing an output to a controller indicative of the presence or absence of that particular ply.

In a proper *prima facie* case of obviousness, every element of the claims must be taught or suggested by the applied references, and there must be some teaching, suggestion or motivation to combine the teachings of the references in the proposed manner.[29]

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[29] See Manual of Patent Examining Procedure §§2143 and 2143.01.

The Examiner has taken the position that Simmons discloses all of the claim limitations except the claimed end-of-web detector, Kopp discloses such an end-of-web detector, and it would have been obvious to use Kopp's end-of-web detector in Simmons'~~s~~ system.

> Simmons, as mentioned above, discloses all of the claimed limitations, except for the end-of-web detector including plural sensors respectively associated with the separate in-feed paths for detecting the presence or absence of the respective ply. However, Kopp et al. teach the end-of-web detector including plural sensors (7, 67, fig. 1) respectively associated with the separate in-feed paths (of three webs 2, fig. 1) for detecting the presence or absence of the respective ply (see col. 2, lines 8-11; col. 3, lines 20-24; col. 4, lines 55-64). Therefore it would have been obvious to one having ordinary skill in the art at the time the invention was made to provide the end-of-web detector including plural sensors respectively associated with the separate in-feed paths as taught by Simmons in the dunnage conversion system and method for converting multiple plies of sheet material into three-dimensional dunnage product of Simmons for detecting the presence or absence of the respective ply and signal generated by the sensor may be used by the controller to stop the feed motor.[30]

The Examiner is correct that Simmons fails to disclose or suggest plural sensors respectively associated with separate infeed paths for detecting the presence or absence of each ply of multiple plies of sheet material. Simmons discloses an automated conversion system for producing a cushioning pad from a multi-ply stock material and then placing the pad into a container. A stock supply assembly for this system includes a single photoelectric sensor 118 and corresponding retroreflector 120 that detect the end of the stock material. When the end of the last ply of stock material

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[30] Office Action, Paper No./Mail Date 20060612, page 3.

has passed the sensor, the sensor sends a signal to a controller 32. The controller may use that signal to discontinue operation of the feed motor or to provide a visual indication that the stock material has run out and needs to be replaced with a fresh supply.[31]

In Simmons's system all of the plies pass between the same sensor 118 and retroreflector 120. Thus, the sensor and retroreflector only sense whether (a) any ply is present or (b) no plies are present. Simmons cannot detect when one ply has run out if another ply is still present. This can present a problem. If the plies are supplied as juxtaposed plies of a multi-ply roll of stock material, the sensor will detect the end of the last ply to pass by the sensor. Because of the nature of the conversion process, one of the plies may bunch between the stock roll and the conversion assembly. Consequently, the ends of the other plies may have passed into the converter housing by the time the bunched ply clears the sensor. This may make if difficult, if not impossible, to splice the leading ends of corresponding plies of a next roll to the trailing ends of the plies that have moved too far into the housing of the converter. A problem also arises if the plies are supplied from different rolls, but this is of no moment to Simmons since the disclosure of Simmons only discusses the use of a multi-ply stock roll.

Kopp discloses using a sensor to detect when a supply of stock material has run out. Kopp does not teach or suggest a conversion assembly that is driven by a motor, a

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[31] Simmons, col. 6, lines 29-54.

controller that controls operation of the motor, and plural sensors respectively associated with the separate infeed paths for detecting the presence or absence of a respective ply and providing an output to the controller indicative thereof. Kopp instead discloses a bag-making machine for making flat packaging bags from a supply of web material. Kopp's machine feeds three separate webs 2 of stock material from three separate supplies along three separate paths to three separate bag-making assemblies arranged side-by-side. Each of these assemblies operates independently to form bags from its own web.[32]

> In the apparatus illustrated in the Figures, a plurality of flat bags 3 (three in the example) are simultaneously formed side by side from three synthetic webs. . . . Each web 2 is associated with an optical barrier 7 which signals a control device when a trailing end of the sheet passes by (indicating that the web reel is empty).[33]

Kopp's description of three side-by-side webs is not apparent from Kopp's Figure 1, which shows a side view, hiding two of the assemblies behind the one shown in Figure 1.

> On the machine frame 10 there are mounted sleds 20 and 21 which are rigidly connected to one another by means of a connecting rod 22 and which are arranged behind one another and movable on rails 23 parallel to the web advancing direction A. ***A separate assembly 20-23 is provided for each web 2.***[34]

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[32] Kopp, col. 1, line 67, through col. 2, line 1.

[33] Kopp, col. 1, line 66, through col. 2, line 11.

[34] Kopp, col. 2, lines 34-39 (emphasis added)..

Like Simmons, Kopp uses a sensor 7 to detect the end of a supply of stock material. When the end of the web passes the sensor, the sensor sends a signal to the bag-making assembly associated with that sensor to interrupt the production of bags from that web. The supply reel for the web is replaced, and the leading end of the new web is stapled to the trailing end of the preceding web. Then the bag-making assembly for that web can be restarted. During this resupply operation, the other bag-making assemblies continue to form bags from their own separate webs.

> In case one of the webs comes to an end, the associated clamping device 46 is, upon a signal from the corresponding sensor 7, released and the clamping device 53 is actuated. The shoes 26, 65 belonging to this web track are automatically deactivated because the sleds 20, 21 are blocked. The webs associated with the other web tracks continue their travel normally, while at the interrupted web track the supply reel for the web 2 is replaced and its leading web end is secured (stapled) to the trailing end of the preceding web.[35]

The Examiner's position that Kopp suggests controlling the motor for the conversion assembly to which multiple plies of sheet material are being fed based on detecting the presence or absence of each ply can only be based on improper hindsight. Nothing in either Simmons or Kopp has been found that suggests sensing each ply of multiple plies of sheet material being fed to a common conversion assembly. For this reason alone, the rejection should be reversed.

Further, no motivation has been found for modifying Simmons's system to include a sensor for each ply of multiple plies of sheet material being fed to the same

[35] Kopp, col. 4, lines 55-64.

conversion assembly. The Examiner must articulate the motivation for modifying the primary reference—Simmons—in such a manner as to arrive at the claimed invention.[36] Not finding any reason in the applied references, the Examiner took the position that the present application provides the motivation. The Examiner maintained that the claimed system would have been obvious to the ordinary skilled person in view of an admittedly known problem with dunnage systems such as Simmons's as motivation for modifying Simmons to arrive at the claimed system.

> Further in response to applaicant' argunets [sic] that there is no teaching or suggestion has been found for sensing the presence or absence of each ply of a multi-ply stock material, note that the applicant is providing teaching/suggestion to provide multiple sensors on page 2 of specification, lines 23-32. And therefore to solve the problems as mentioned by applicant (on page 2, lines 23-32) one having ordinary skill in the art would have used separate sensor as taught by Kopp in the dunnage conversion system of Simmons.[37]

The passage of applicant's specification cited by the Examiner identifies a problem with systems such as Simmons's, but does not teach or suggest providing a sensor for each ply.

> For a long time now, operators of the converters that use multi-ply paper have encountered a problem in that ends of the plies of a spent roll do not always align with one another. The end of one or more of the plies may be short of the end of another ply. This could arise from the original winding process where the multiple plies do not begin at the same point on the core of the stock roll. However, usually the problem arises from a slight differential consumption rate of the multiple plies which causes a

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[36] M.P.E.P. §2144.08(III).

[37] Advisory Action, Part of Paper No. 20060804, page 2.

> loop to form in one or more of the plies. When the trailing ends of the plies leave the core at the end of spent roll, the loop in the ply causes that ply to be longer than the other ply or plies. With the prior art end-of-web detector, the sensor triggers an end-of-web command only after the longest ply has passed the beam path.
>
> Quite frequently, the end of one or more of the plies may be so short that it has passed the end of the splicing plate by the time the converter is stopped, thereby making it very difficult, if not impossible, to splice to it a ply from a new stock roll. If the splice cannot be made, the operator has to remove the remainder of the stock material from the spent roll and thread the leading end of the stock material from the new roll through the machine, which is a much more difficult and time-consuming process than simply splicing the leading end of a new roll to the trailing end of a spent roll.[38]

While this passage admits that the problem was known, the solution – providing separate sensors for each ply – is neither taught nor suggested.

Admittedly, motivation to combine references also can come from the problem to be solved – but neither Simmons nor Kopp recognize the problem with multiple plies of sheet material where less than all of the plies may end before one or more other plies. When Simmons detects the end of the supply of stock material, Simmons does not recognize that one or more plies may have ended long before the longest ply, at which point it may be difficult or impossible to splice the shortest ply to a ply from a new supply. Unlike Simmons, Kopp discloses three separate webs fed along parallel paths to their own respective bag-making assemblies. Consequently, Kopp's system does not have this problem. In Kopp's system, if one web runs out before the others, Kopp can

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[38] Specification, page 2, line 16, through page 3, line 2.

replace the supply for that bag-making assembly without stopping any of the other webs from continuing to feed into their respective bag-making assemblies.

Since both Simmons and Kopp teach sensing the end of the supply of stock material, the skilled person seeking to improve Simmons's system would at most be motivated by Kopp to provide separate supplies of sheet material to a plurality of conversion machines placed side-by-side. Thus one or more conversion machines could continue to convert sheet material into dunnage product even when the sheet material for one machine runs out and has to be replenished.

Even with knowledge of Simmons and Kopp and the problems of Simmons's system, no combination of Simmons and Kopp would yield the claimed system because neither teach or suggest providing a sensor for each ply of several plies being fed to the same conversion assembly and controlling a motor for such common conversion assembly based on whether the sensor detects the presence of absence of each ply. Consequently, the rejection should be reversed.

Claim 8

Claim 8 recites a method of converting multiple plies of sheet material into a relatively less dense, three-dimensional dunnage product, comprising *inter alia* the steps of feeding multiple plies of sheet stock material to a conversion assembly along respective infeed paths, using plural sensors respectively associated with the separate infeed paths to detect the presence or absence of the respective ply, and ceasing

operation of the motor in the conversion assembly in response to a signal from any one of the plural sensors.

Similar to the discussion above about claim 1, Simmons and Kopp fail to disclose the step of using plural sensors respectively associated with separate infeed paths to a common conversion assembly to detect the presence or absence of the respective ply. As noted above with regard to claim 1, the system described by Simmons, for example, can present a problem in that it generally is difficult, if not impossible, to splice a new ply to the end of a preceding ply if the ends of the other plies have passed into the converter housing by the time the last ply clears the sensor.

Simmons discloses a sensor that signals a motor in a conversion assembly to stop when all of the plies of stock material have passed the sensor, but does not disclose plural sensors respectively associated with separate infeed paths to a conversion assembly. The Examiner has taken the position that Kopp teaches multiple sensors, any one of which can send a signal to stop a motor when the end of a single ply is reached. Thus the Examiner concludes that Kopp suggests modifying Simmons to include such a sensor for each ply of Simmons's multi-ply stock material.

> In this instance, Examiner relied on Kopp's reference for providing sensor for each one of the multiple plies of sheet material of Simmons to detect the shortest web of the multiple webs and subsequently generate the signal to stop the feed motor. Since there is only one motor in the Simmons reference, when any one of the plurality of sensors detect the end of the respective ply it will stop only the feed motor. And therefore the combination of Simmons and Kopp take, as a whole would suggest to a

person of ordinary skill in the art to combine the references of Simmons and Kopp.[39]

The Examiner's conclusion – that Kopp suggests modifying Simmons's system to include a sensor for each ply of multiple plies of sheet material – is not supported by Simmons and Kopp. At most, the skilled person would modify Simmons to provide multiple converters in parallel.

As noted above, Simmons teaches a single conversion machine with a single sensor for detecting the end of a multi-ply supply of stock material. In contrast, Kopp teaches plural bag-making assemblies arranged in parallel, each of which has its own supply of stock material and its own sensor for detecting the end of the respective supply. Thus the ordinary skilled person would be motivated by Kopp to modify Simmons to provide multiple converters arranged side-by-side.

Additionally, even knowing the problem with Simmons's system that is described in the present application, Kopp would not teach the skilled person to provide a sensor for each ply in Simmons's system because Kopp does not provide a sensor for each ply of a multi-ply stock material being fed into a common conversion assembly. Accordingly, no combination of Simmons and Kopp would teach or suggest providing a conversion machine with a sensor for each ply of multiple plies of sheet material.

Moreover, neither Simmons nor Kopp teach or suggest ceasing operation of a motor in response to a signal from any one of plural sensors. Simmons does not teach

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[39] Office Action, Paper No./Mail Date 20060612, pages 5-6.

plural sensors, and each of Kopp's sensors only control the brake arms associated with that particular sensor and bag-making assembly. So when one of Kopp's sensors detects the end of the respective web, only the bag-making assembly associated with that sensor is stopped. The other bag-making assemblies can continue to operate. Therefore Kopp would not motivate the ordinary skilled person to modify Simmons's system to include a sensor for each ply and to cease operation of a motor in response to a signal from any one of the sensors.

For any of the above reasons, the rejection should be reversed.

Claim 14

Claim 14 recites a dunnage conversion system comprising (a) means for converting multiple plies of sheet stock material into a relatively less dense, three-dimensional dunnage product, where the multiple plies of sheet stock material are fed to the means for converting along respective infeed paths, (b) means for detecting the presence of each ply associated with the respective infeed paths and for providing an output indicating the presence or absence of each ply, and (c) means for controlling the means for converting in response to the output from the means for detecting.

The Examiner has taken the position that the aforementioned rejections of claims 1 and 8 apply to claim 14 as well.

> Regarding claim 14, the conversion system of Simmons as modified by Kopp, as mentioned above, teaches the means for converting or equivalent three of, means for detecting the presence of each ply or

equivalent three of and means for controlling the means for converting or equivalent three of.[40]

For the same reasons specified for claims 1 and 8, the rejection of claim 14 should be reversed. No motivation has been found for modifying Simmons's system to include means for detecting the presence of each ply associated with respective infeed paths and for providing an output indicating the presence or absence of each ply. Reversal of the rejection is respectfully requested.

VIII. Conclusion

In view of the foregoing, it is respectfully submitted that the claims are patentable over the applied art and that the final rejection should be reversed.

Respectfully submitted,

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[40] Office Action, Paper No./Mail Date 20060612, page 4.

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Claims Appendix

1. A dunnage conversion system for converting multiple plies of sheet material into a relatively less dense, three-dimensional dunnage product, the system comprising: a converter including a conversion assembly that is driven by a motor to advance multiple plies of sheet material through the converter for conversion of the multiple plies of sheet material into a relatively less dense, three-dimensional dunnage product, where the multiple plies of sheet stock material are fed to the conversion assembly along respective infeed paths; a controller that controls operation of the motor; and an end-of-web detector located upstream of the conversion assembly, the end-of-web detector including plural sensors respectively associated with the separate infeed paths for detecting the presence or absence of the respective ply and providing an output to the controller indicative thereof.

2. A conversion system as set forth in claim 1, wherein the plural sensors each include a transmitter for transmitting an electromagnetic beam and a receiver for receiving the electromagnetic beam.

3. A conversion system as set forth in claim 2, wherein the transmitter and receiver of each sensor are located on the same side of the infeed path for the respective ply of sheet stock material, and the end-of-web detector further includes a reflective surface for each sensor disposed on an opposite side of the infeed path and

positioned to reflect the electromagnetic beam transmitted by the transmitter to the receiver of the respective sensor.

4. A conversion system as set forth in claim 3, wherein the reflective surfaces for a pair of the sensors are located on opposite sides of a reflector body located between the infeed paths of respective plies of the sheet stock material.

5. A conversion system as set forth in claim 4, comprising a splicing surface against which the trailing ends of the plies of a spent supply of stock material can be joined to the leading ends of the plies of a new supply of stock material, and the sensors are located at an upstream end of the splicing surface.

6. A conversion system as set forth in claim 5, further comprising at least one separator member interposed between the infeed paths of the sheet stock material plies for separating the plies, and wherein the reflector body is located between the splicing surface and the spacer member.

7. A conversion system as set forth in claim 1, further comprising at least one separator member interposed between the infeed paths of the sheet stock material plies for separating the plies.

8. A method of converting multiple plies of sheet material into a relatively less dense, three-dimensional dunnage product, comprising the steps of:

operating a motor of a converter to drive a conversion assembly that advances multiple plies of sheet material through the converter for conversion of the multiple plies of sheet material into a relatively less dense dunnage product;

feeding multiple plies of sheet stock material to the conversion assembly along respective infeed paths;

using plural sensors respectively associated with the separate infeed paths to detect the presence or absence of the respective ply; and

ceasing operation of the motor in response to a signal from any one of the plural sensors.

9. A method as set forth in claim 8, further comprising the step of splicing a leading end of a new ply of sheet stock material to a trailing end of an old ply of sheet stock material after the motor has ceased operation.

10. A conversion system as set forth in claim 6, wherein the at least one separator member includes a roller.

11. A conversion system as set forth in claim 6, wherein the at least one separator member extends across the infeed path of the sheet stock material.

12. A conversion system as set forth in claim 7, wherein the at least one separator member includes a roller.

13. A conversion system as set forth in claim 7, wherein the at least one separator member extends across the infeed path of the sheet stock material.

14. A dunnage conversion system for converting multiple plies of sheet material into a relatively less dense, three-dimensional dunnage product, the system comprising:

means for converting multiple plies of sheet stock material into a relatively less dense, three-dimensional dunnage product, where the multiple plies of sheet stock material are fed to the means for converting along respective infeed paths;

means for detecting the presence of each ply associated with the respective infeed paths and for providing an output indicating the presence or absence of each ply; and

means for controlling the means for converting in response to the output from the means for detecting.

Evidence Appendix

None.

Related Proceedings Appendix

None.